

**Storrs Center
Special Design District
MASTER TRAFFIC STUDY
PURSUANT TO MANSFIELD ZONING REGULATIONS
ARTICLE X, SECTION T.3.c (iii)**

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EXECUTIVE SUMMARY

Storrs Center will be a mixed use development along the easterly side of Storrs Road (State Route 195), roughly between Dog Lane and Post Office Road in the Town of Mansfield.

The Mansfield Downtown Partnership, an independent non-profit corporation, was designated by the Mansfield Town Council as the municipal development agency for Storrs Center. The Mansfield Downtown Partnership is composed of representatives from the community, business, Town government and the University of Connecticut.

Both the project itself and the environs are unique, at least for Connecticut. The plan will combine architecture, pedestrian oriented streets, and public spaces into a series of small neighborhoods, making up the fabric of a new Town center, following carefully crafted design guidelines. Ground floor retail and commercial uses will be supported by residences above and throughout the neighborhood.

Storrs Center will contain a mix of uses, including a new Town Square, residential units (mostly efficiencies and one bedroom), retail, restaurant and office space. Fee based parking will be provided, primarily in structures, but also on street. Only about one-third of the 48 acre site will be developed.

Several access points to Storrs Center will be provided. Three will be located along Storrs Road (State Route 195), one on Post Office Road and one along Dog Lane. In addition, a secondary one-way in only access will be provided on Storrs Road near Post Office Road. It is anticipated that all the access roads will become public streets.

Traffic operations at key intersections along Storrs Road (State Route 195) were reviewed, specifically to determine their current operating parameters, and the ability to absorb new site traffic. The work effort included field reconnaissance and observation, collection of peak period and daily traffic volume information, projection of travel demand and capacity analyses.

Storrs Road (State Route 195) is a two lane north-south facility, carrying 15,000-16,000 daily trips in this area. It is classified by the Connecticut Department of Transportation as a principal arterial, to some degree conflicting with its local function as the main route servicing the University of Connecticut, the Mansfield Town Hall and E.O. Smith High School. There are several signalized intersections and uncontrolled pedestrian crossings.

Due to the presence of the University of Connecticut, public transportation service in the area is more extensive than one would find in the typical suburban environment. The University Department of Parking and Transportation Services operates several bus routes to or near the Storrs Center site. In addition, the Windham Regional Transit

District runs a Storrs/Mansfield route during the day from the Route 44 area, through campus to downtown Willimantic.

The net increase in vehicular traffic resulting from the Storrs Center development was estimated to be about 315 morning, and 700 afternoon peak hour trips. These trips were assigned to the adjacent street network, which was analyzed to determine if sufficient capacity was available. Mitigation is recommended herein to maintain acceptable traffic operation within the project vicinity. By implementing these improvements, all critical intersections will operate at an overall level of service (LOS) “D” or better. In addition, all individual traffic movements, with the exception of two at the North Eagleville Road (State Route 430) intersection will operate at a “D” or better level of service.

Recommended improvements to maintain acceptable traffic operations, some of which are already included in the plans, include the following:

- Storrs Road (State Route 195) at Bolton Road and Dog Lane – As shown on the plans, the offset intersection will be reconfigured to a more conventional four way type, simplifying the traffic signal operation.
- Storrs Road (State Route 195) at Mansfield Road - Construct a southbound Storrs Road (State Route 195) right turn lane. The most problematic traffic movement, the southbound through movement, would then operate at a

minimum level of service of “D”. As part of STC Certificate #904E, issued to UCONN in 2000, Mansfield Road must be widened to provide a proper 2-lane approach to State Route 195. These two improvements should be coordinated.

- Storrs Road (State Route 195) at South Eagleville Road (State Route 275) and Post Office Road – As shown on the plans, Post Office Road will be widened to provide for a two-lane approach to the traffic signal. This would result in a “D” level of service for the approach rather than “F”.
- Storrs Road (State Route 195) at North Eagleville Road (State Route 430) and Gurleyville Road- A retiming of the traffic signal can provide some degree of mitigation for the projected afternoon operations at this location. It is understood from the Town that there may be some technical/maintenance issues with the existing traffic controller (owned by the State) that may first have to be addressed. The Town has requested CTDOT to review the situation. The Gurleyville Road intersection would operate essentially as under background conditions, while the N. Eagleville Road would operate at an overall level of service of “C” rather than “D”. The volume to capacity ratio for all traffic movements at the North Eagleville Road intersection would be less than 1.0, but an “E” level of service will remain for the North Eagleville Road left turn movement (same as in background), and the Storrs Road (State Route 195) southbound through movements. Physical alterations at this intersection have been discussed over the years, but never implemented. These consisted of the

modification of the North Eagleville Road lane arrangement to provide a double left turn, combined with the provision of two North Eagleville Road northbound lanes to receive the traffic. The planned extension of North Hillside Road to Route 44 will siphon off some traffic in this area, particularly through this intersection, resulting in an improvement in traffic operations.

- Storrs Road (State Route 195) - Mid-block pedestrian crossings - There are two existing mid-block pedestrian crossings located between South Eagleville Road (State Route 275) and Bolton Road. They will be maintained, although the most southerly will be shifted to the south, closer to Town Hall. Since traffic on Storrs Road (State Route 195) will be increased, consideration should be given to installation of pedestrian crossing enhancements, such as in pavement warning lights or pedestrian activated beacons.
- Transit – The University should work closely with Storrs Center to enhance service to the site. This might include extension or modification of existing routes, and expanded weekend and evening service. In addition, appropriate bus shelters and stops should be provided.
- Cut through traffic – Concerns have been expressed about the potential for through traffic to use local streets, such as Gurleyville Road, Willowbrook Road, Hanks Hill Road or Separatist Road as a cut through to reach, or bypass, the Storrs Center area. While it is impossible to quantify such movements, and the

alternative routes are generally longer (time and distance), there may be an increase in traffic along alternative routes. Should an undesirable situation develop, the implementation of traffic calming techniques, such as speed humps as exist along Dog Lane, Eastwood and Westwood Road, traffic circles, or entrance treatments may be appropriate. The Town will monitor the situation and install calming treatments as needed.

The following table shows the overall intersection level of service under the “build” and “build with improvement” scenarios for those intersections where mitigation is proposed.

Peak Hour Overall Intersection Level of Service Summary - Mitigation

Intersection	Build	Build w/Improvement
State Route 195 at S. Eagleville/Post Office	C(D)	C(C)
State Route 195 at Mansfield Road	B(E)	A(C)
State Route 195 at Gurleyville Road	B(C)	-(C)
State Route 195 at N. Eagleville Road	B(D)	-(C)

Morning Peak Hour = X, Afternoon Peak Hour = (X)

The potential traffic impact of Storrs Center on the nearby roadway network can be mitigated to a large degree with the above improvements. There are two recommendations in the recently completed Storrs Campus Master Plan Update that will be beneficial to traffic operations along the Storrs Road (State Route 195) corridor, as well as reducing cut through traffic in residential neighborhoods. The first is the extension of North Hillside Road from its current terminus on campus to Route 44. Environmental impact documents are currently being prepared and the roadway is

anticipated to be constructed in 2010 or 2011. This extension will provide traffic relief along the Storrs Road (State Route 195) corridor, although such benefit is not quantified and has not been incorporated into this study. The existing and/or potential problems at the North Eagleville Road (State Route 430) intersection should be mitigated when North Hillside Road is extended to Route 44. The second project is the extension of Bolton Road to South Eagleville Road (State Route 275). This should provide some traffic relief at the south end of Storrs Road (State Route 195), as well as for the Eastwood/Westwood Road neighborhood.

I. INTRODUCTION

Storrs Center will be a mixed use village and main street corridor to be developed along the easterly side of Storrs Road (State Route 195), roughly between Dog Lane and Post Office Road in the Town of Mansfield. Developed portions of the 48± acre site are currently occupied by a variety of retail, university and commercial uses. The site has frontage along State Route 195 (Storrs Road), Dog Lane and Post Office Road. Several existing retail businesses along Storrs Road, those contained in University Plaza (Friendly's, et al) and Storrs Commons (Starbucks, et al), are not included in the rezoning application.

The Mansfield Downtown Partnership, an independent non-profit corporation, was designated by the Mansfield Town Council as the municipal development agency for Storrs Center. The Mansfield Downtown Partnership is composed of representatives from the community, business, Town government and the University of Connecticut.

Both the project itself and the environs are unique, at least for Connecticut. The plan will combine architecture, pedestrian oriented streets, and public spaces into a series of small neighborhoods, making up the fabric of a new Town center, following carefully crafted design guidelines. Ground floor retail and commercial uses will be supported by residences above and throughout the neighborhood.

Specifically, the application proposes a mix of uses, including a new Town Square, up to 690 residential units (mostly efficiencies and one bedroom), 164,000± square feet of retail space and 46,750± square feet of office space. Parking will be provided for 1630± vehicles, primarily structured. On street parking will also be provided. Only about one-third of the 48± acre site will be developed.

Traffic operations at key intersections along Storrs Road (State Route 195) were reviewed, specifically to determine their current operating parameters, and the ability to absorb new site traffic. This study reviewed the traffic operational and capacity characteristics of the adjacent street network during the weekday morning and afternoon peak hours. The work effort included field reconnaissance and observation, collection of peak period and daily traffic volume information, projection of travel demand and capacity analyses.

Capacity analyses were performed at key intersections to evaluate the existing levels of service (LOS) and delays. These were compared to that which would be expected after development. Where appropriate, recommendations were made to improve transportation operations along the impacted network.

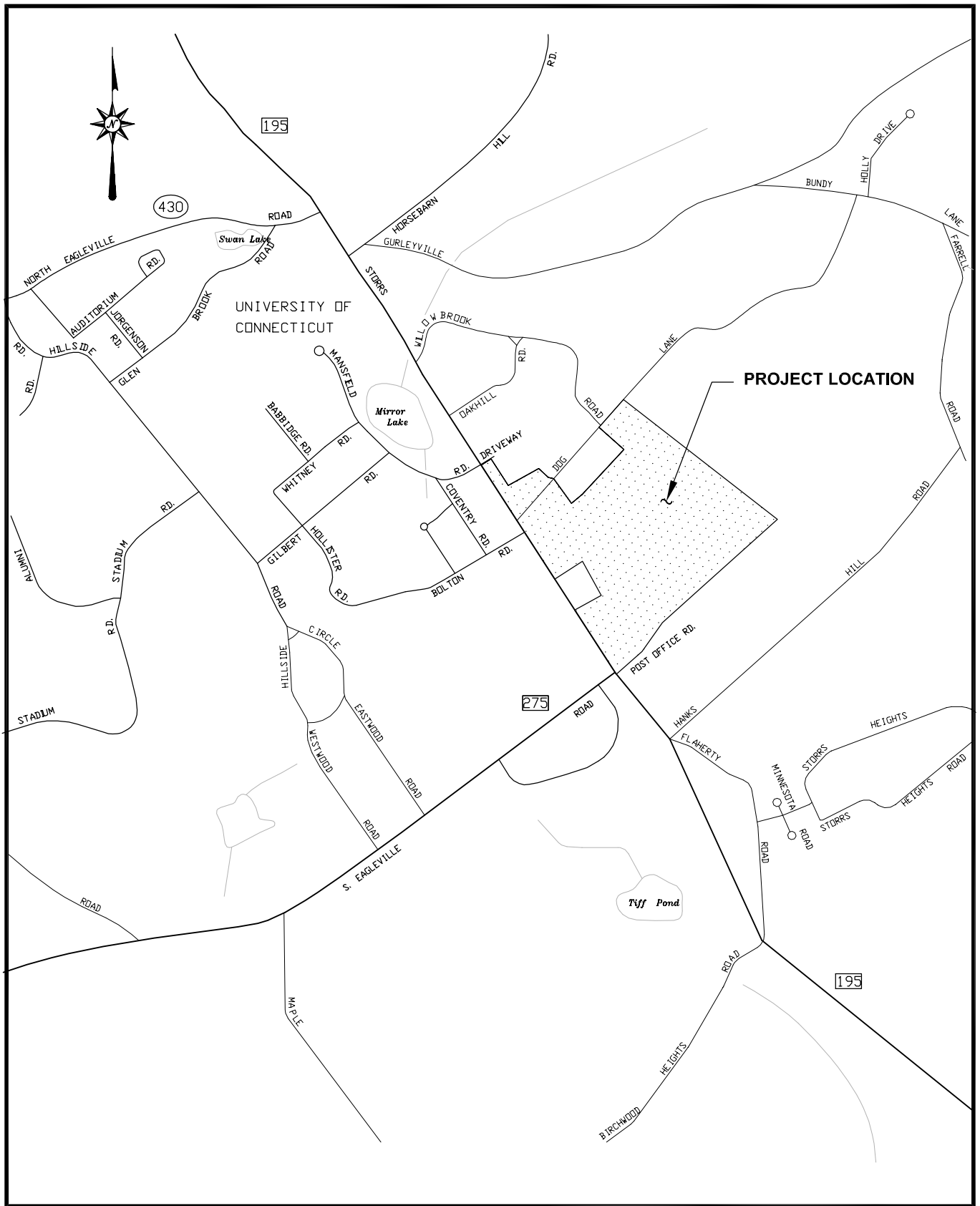
II. EXISTING CONDITIONS

An investigation of the existing conditions of the adjacent transportation network formed the basis for determining the traffic impacts of the proposed development. This investigation included a field reconnaissance, research of pertinent planning and traffic data at local and State agencies, and a manual traffic counting program.

Access Network

As illustrated in Figure 1, the site is located on the easterly side of Storrs Road (State Route 195). It is roughly bordered on the west by Storrs Road (State Route 195), the north by Dog Lane, the east by residential or undeveloped properties, and the south by Post Office Road. Key roads in the site vicinity that may be of interest include Storrs Road (State Route 195), South Eagleville Road (State Route 275), North Eagleville Road (State Route 430), Mansfield Road, Post Office Road, Bolton Road and Dog Lane.

Storrs Road (State Route 195), in the vicinity of the site, is a two lane north-south facility. It is classified by the Connecticut Department of Transportation as a principal arterial. To some degree that conflicts with its local function as the main route servicing the University of Connecticut, the Mansfield Town Hall and E.O. Smith High School. The horizontal alignment is generally straight with a rolling vertical profile. Sidewalks



LOCATION PLAN STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 1

and illumination are provided. In the project area, the predominant adjacent land use is the University of Connecticut, but includes other public facilities and some retail plazas. The posted speed limit is 30 miles per hour in the site vicinity. There are several signalized intersections and uncontrolled pedestrian crossings

South Eagleville Road (State Route 275) is a two-lane, east west route running south of the campus proper. The intersection with Storrs Road (State Route 195) is signalized. The posted speed limit is 30 miles per hour. Adjacent land uses along South Eagleville Road (State Route 275) near Storrs Road (State Route 195) consist of apartments, university and municipal facilities. About two miles to the west, South Eagleville Road (State Route 275) intersects Route 32.

North Eagleville Road (State Route 430) is a two lane east-west facility running along the northern periphery of campus. It is signalized at the intersection with Storrs Road (State Route 195). The posted speed limit is 25 miles per hour. About two miles to the west of campus, North Eagleville Road intersects Route 32.

Mansfield Road is a two lane campus facility. It has a 25 mile per hour speed limit and is signalized at Storrs Road (State Route 195), along with the driveway to the Bishop Center.

Post Office Road is a two lane dead end facility intersecting Storrs Road (State Route 195) directly opposite South Eagleville Road (State Route 275). It services the Post

Office, E.O. Smith athletic fields and a residential complex. The Storrs Center plan will make a connection to Post Office Road.

Bolton Road is a two lane east-west facility running along the southern periphery of the campus proper. In the vicinity of Storrs Road (State Route 195), Bolton Road services E.O. Smith High School, the University School of Fine Arts, and the Connecticut Repertory theater. Bolton Road is signalized at Storrs Road (State Route 195).

Dog Lane is a two lane local street intersecting Storrs Road (State Route 195) about 100 feet north of Bolton Road. Dog Lane has a 25 mile per hour speed limit. In the immediate project area it services some commercial uses, university facilities and a church. Further to the east, abutting land uses become more residential, and the road has a series of speed humps.

Intersection Geometry and Control

The following five signalized intersections along the Storrs Road (State Route 195) corridor were reviewed:

Storrs Road (State Route 195) at South Eagleville Road (State Route 275) and Post Office Road create a four-legged intersection. The Storrs Road (State Route 195) northbound approach has a left turn lane and a through lane, while the southbound approach has a left turn lane and two through lanes. The South Eagleville Road (State Route 275) approach has a left turn lane and a shared through/right lane. Post Office

Road has a single lane approach. The traffic signal control provides for protected/permitted Storrs Road (State Route 195) left turns along with a pedestrian phase.

Storrs Road (State Route 195) at Bolton Road and Dog Lane is an offset intersection, located about 1350 feet north of South Eagleville Road (State Route 275). Both Storrs Road (State Route 195) approaches have a left turn lane and a through lane. The side streets, offset by about 100 feet, both have a left turn and a right turn lane approaching the intersection. They move on separate traffic signal phases. The traffic signal control also provides a pedestrian phase. An uncontrolled driveway to the abutting strip center also exists opposite Bolton Road.

Storrs Road (State Route 195) at Mansfield Road and the driveway to the Bishop Center is a four way intersection, located about 575 feet north of Dog Lane. Approach lane configurations include one left turn lane and one through lane for each direction on Storrs Road (State Route 195), an extremely short two lane approach for Mansfield Road, and a single lane for the Bishop Center driveway. The traffic signal operates with a northbound left turn phase and a pedestrian phase. It should be noted that as part of STC Certificate #904E, issued in 2000, UCONN must widen Mansfield Road to provide a proper 2-lane approach to State Route 195. This work, however, has not been done yet.

Storrs Road (State Route 195) at Gurleyville Road (Horsebarn Hill Road) is a “T” type intersection, offset by about 350 feet south of North Eagleville Road (State Route 430). The Northbound Storrs Road (State Route 195) approach has two through lanes for a distance of about 200 feet approaching the intersection. Operationally, the left through lane continues beyond the intersection and becomes the left turn lane at North Eagleville Road. The southbound approach includes one through lane and one left turn lane. The Gurleyville Road approach provides two lanes. The intersection is controlled jointly with the North Eagleville Road (State Route 430) intersection. The side streets move separately and there is a pedestrian phase. The Town has indicated that there may be operational/maintenance issues with the existing traffic controller and has recently requested CTDOT to review the situation.

Storrs Road (State Route 195) at North Eagleville Road (State Route 430) is a “T” type intersection, The Storrs Road (State Route 195) northbound approach consists of a left turn lane and a through lane. The Storrs Road (State Route 195) southbound approach is designated as one through lane and an exclusive right turn lane. The North Eagleville Road (State Route 430) approach is designated as an exclusive left turn lane and an exclusive right turn lane.

Current Peak Hour Traffic Volumes

Morning and afternoon peak period traffic volume data were obtained at the following intersections:

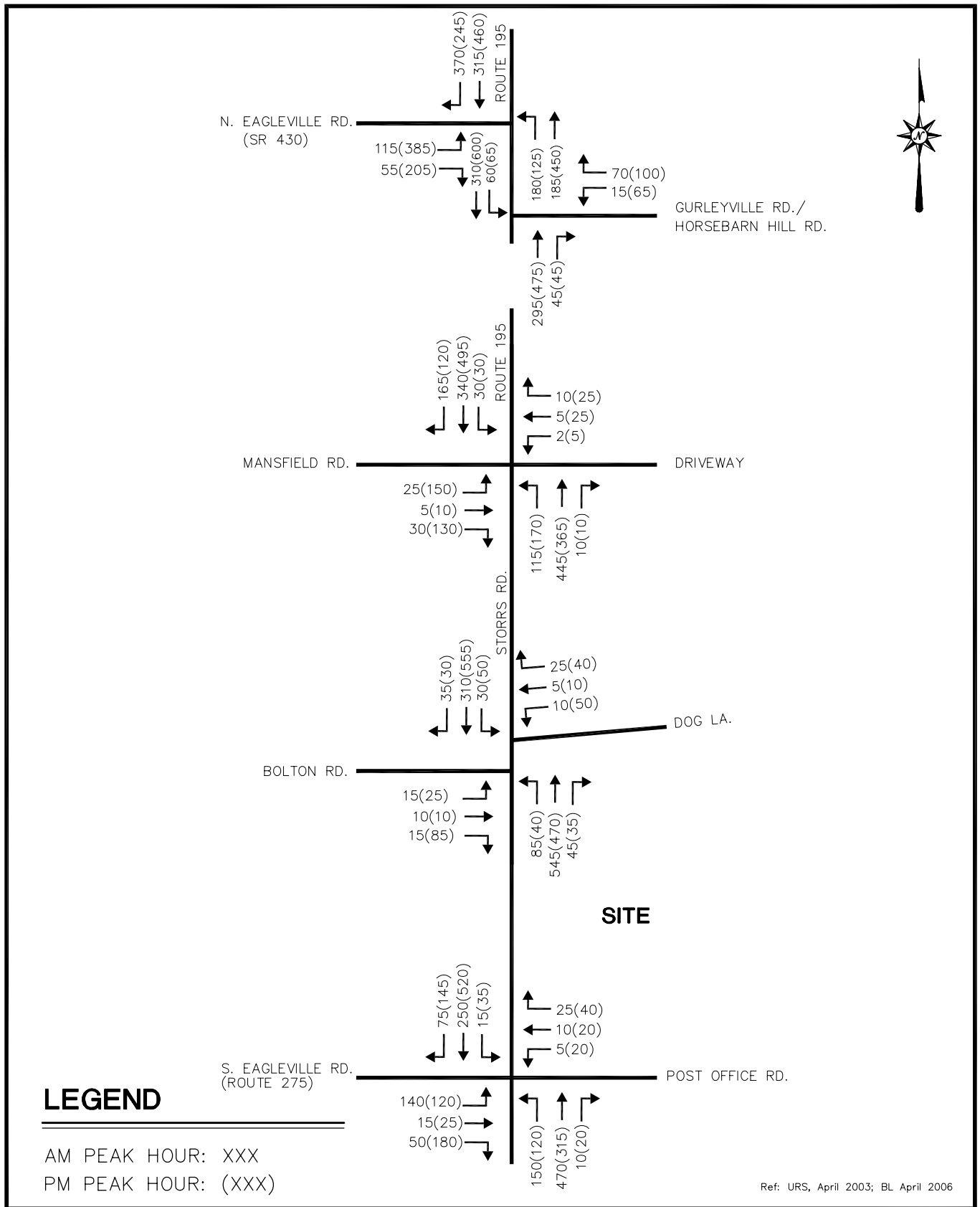
- Storrs Road (State Route 195) at South Eagleville Road (State Route 275) and Post Office Road

- Storrs Road (State Route 195) at Bolton Road and Dog Lane
- Storrs Road (State Route 195) at Mansfield Road
- Storrs Road (State Route 195) at North Eagleville Road (State Route 430)
- Storrs Road (State Route 195) at Gurleyville Road (Horsebarn Hill Road)

The turning movement data was recorded during the weekday morning and afternoon commuter peaks in April of 2003, supplemented in April of 2006. These existing peak hour traffic volumes are illustrated in Figure 2. Peak hour traffic volumes on Storrs Road (State Route 195) in front of the site were approximately 1,000 vehicles during the morning period and 1,200 during the afternoon.

Average Daily Traffic

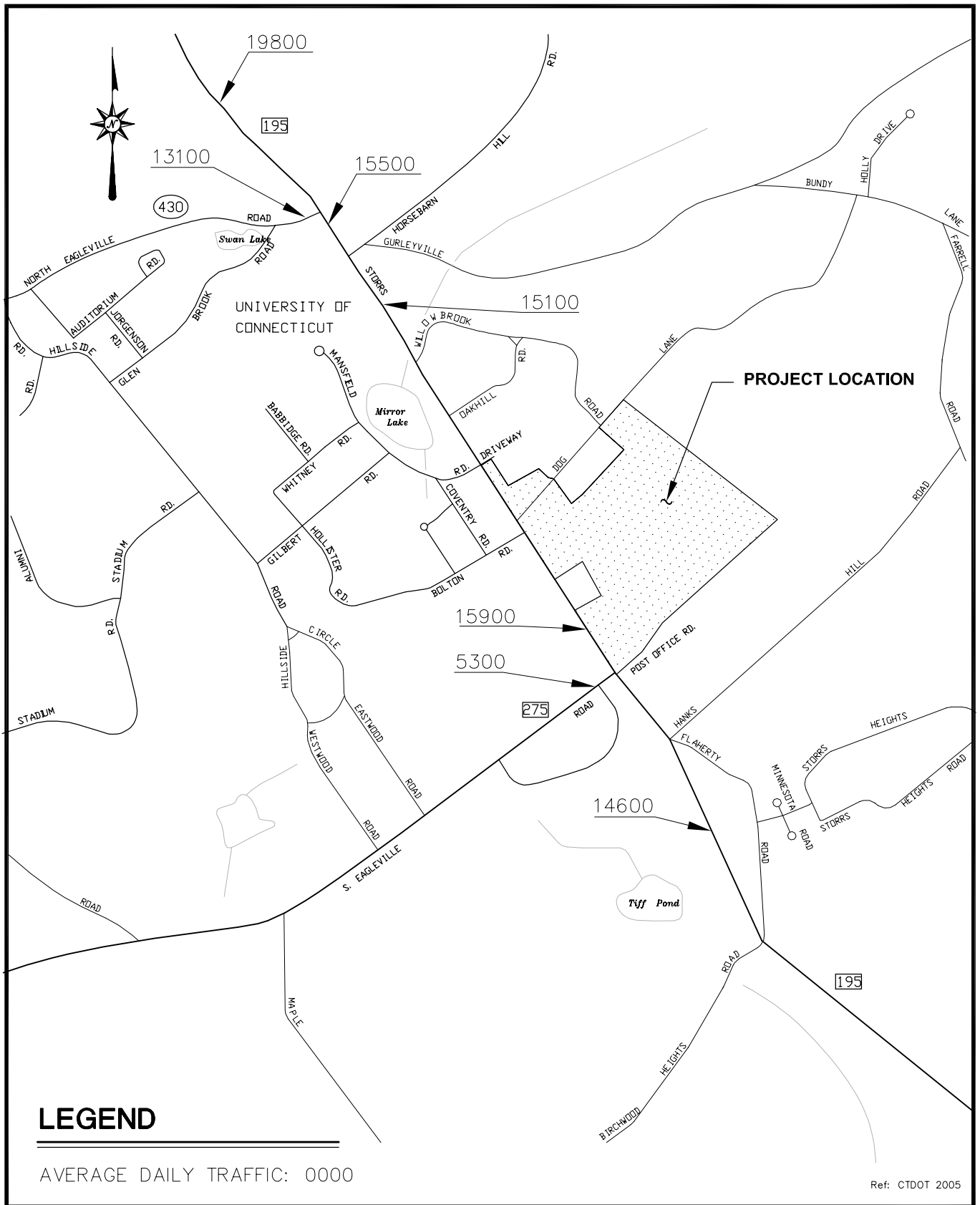
Average daily traffic (ADT) data was obtained for roads in the site vicinity from the Connecticut Department of Transportation (CTDOT). Most of the roadways close to the site carry moderate to heavy volumes. Storrs Road (State Route 195) experienced an ADT volume ranging from 19,800 vehicles north of North Eagleville Road, to 14,600 south of South Eagleville Road (State Route 275). Through the campus Storrs Road (State Route 195) generally accommodated 15,000-16,000 daily trips. South Eagleville Road (State Route 275) carried about 5,300 daily trips, and North Eagleville Road (State Route 430) about 13,100 daily trips, west of Storrs Road (State Route 195). Figure 3 shows the average daily traffic volumes. Daily traffic volumes are not used in the capacity analyses, but provide an indication of overall usage.



CURRENT PEAK HOUR TRAFFIC VOLUMES STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 2



AVERAGE DAILY TRAFFIC VOLUMES STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 3

Public Transportation

Due to the presence of the University of Connecticut, public transportation service in the area is more extensive than one would find in the typical suburban environment. The University Department of Parking and Transportation Services operates several bus routes to or near the Storrs Center site.

- The Yellow Line – runs on 24 minute headways during the day from the Mansfield apartments on South Eagleville Road, past the site, up Bolton Road and looping through campus via Gilbert Road, Mansfield Road, North Eagleville Road and Hillside Road.
- The Blue Line – runs on 12 minute headways during the day from the “W” parking lot north of the Towers Complex along Storrs Road (State Route 195) to Mansfield Road, where it loops through Campus past Gampel Pavilion to the Hilltop complex and “I” lot. The Blue line does not run past the site proper, the closest point being the intersection of Storrs Road (State Route 195) with Mansfield Road.
- The Green Line - runs on 9 minute headways during the day from North Campus to the Charter Oak Complex, looping through Campus via Hillside Road, Gilbert Road, Mansfield Road and North Eagleville Road. The Green line does not run past the site proper, the closest point being the intersection of Mansfield Road with Gilbert Road.
- The Red Line - runs on 13 minute headways during the day between the “W” lot and the Towers through campus to the Hilltop complex, “I” lot and eventually to the center of campus. The Red line does not run past the site proper, the closest

point being the intersection of Storrs Road (State Route 195) with North Eagleville Road.

- The Apartment shuttle - runs on 18 minute headways from the Depot Campus, along Hunting Lodge, North Eagleville, Storrs, Mansfield, Glenbrook and Hillside Roads. The Apartment shuttle does not run past the site proper, the intersection of Mansfield Road with Storrs Road (State Route 195) being the closest point.

The above routes generally run from 7:00 AM to midnight, Monday-Thursday, and from 7:00 AM to 10:00 PM on Friday, when classes are in session. There is no weekend service. Weekend service is provided by the weekend shuttle.

- The Weekend Shuttle - runs on 36 minute headways serving the residential complexes on Campus. Saturday service is from 11:00 AM to 6:00 PM, while Sunday service is from 6:00 PM to midnight. The Weekend Shuttle does not run past the site proper, the intersection of Mansfield Road at Storrs Road (State Route 195) being the closest point.

One Saturday a month, a shuttle between the UConn Co-op and the Buckland Mall is provided at noon, 3:00 PM and 5:00 PM.

In addition, the University runs the Storrs/Mansfield evening shuttle from the Route 44 area, through campus along Storrs Road (State Route 195), to the Eastbrook Mall and

downtown Willimantic. This shuttle runs once an evening, Monday through Friday. It passes the Storrs Center site.

Finally, Mondays through Saturdays, the Windham Regional Transit District runs the same Storrs/Mansfield route during the day from the Route 44 area, through campus along Storrs Road (State Route 195), to the Eastbrook Mall and downtown Willimantic. It passes the Storrs Center site.

Maps of the routes, taken from the University web site, can be found in the Appendix of this report.

Accident Data

Accident data in the immediate site area was obtained from the CTDOT for the three-year period from January 1, 2002 to December 31, 2004. The 4,500± foot long section of Storrs Road (State Route 195) between South Eagleville Road (State Route 275) and North Eagleville Road (State Route 430) was reviewed. There were 111 accidents reported during that three year period. About 60% of the accidents were rear end collisions. Most of the accidents were concentrated in the following areas:

- State Route 195 at South Eagleville Road* - 9
- State Route 195 at private drives between South Eagleville Road and Bolton Road -10
- State Route 195 at Dog Lane and Bolton Road* -12
- State Route 195 at Mansfield Road* - 6
- State Route 195 at Willowbrook Road- 5
- State Route 195 midway between Willowbrook Road and Gurleyville Road* -11
- State Route 195 between Gurleyville Road and North Eagleville Road* -21

* - signalized

None of the above appears to have an unusual frequency or pattern, except for the spot along State Route 195 midway between Willowbrook Road and Gurleyville Road. It appears that this is the signalized pedestrian crossing at Whitney Hall. Eight of the eleven reported accidents were northbound rear end collisions.

III. ANTICIPATED TRAFFIC CONDITIONS

Peak hour traffic volumes expected to be generated by Storrs Center were estimated, assigned to the roadway network, and superimposed onto projected background traffic volumes. This methodology provides a year of completion estimate for analysis.

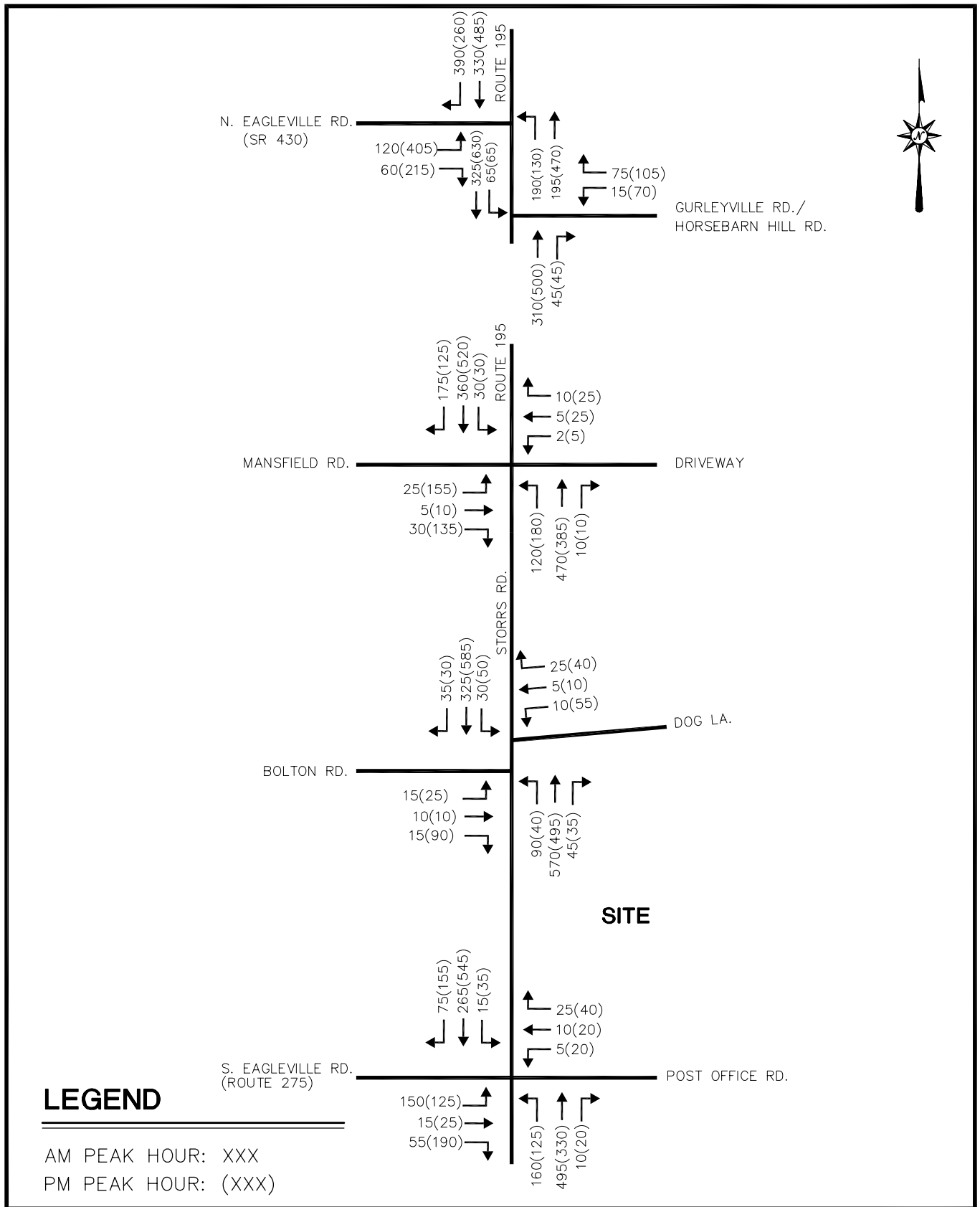
Background Traffic Volumes

The existing peak hour traffic volumes were increased to reflect local and regional growth trends in the area to the year of project completion (2012). After review of traffic volumes in the area over the past few years, background growth was based on a rate of one percent per year for the five year build out. These peak hour background traffic volumes are depicted in Figure 4.

Site Access

Several access points to the Storrs Center will be provided. Three will be located along Storrs Road (State Route 195), one will be located on Post Office Road, and one along Dog Lane. In addition, a secondary one-way in only access will be provided on Storrs Road (State Route 195) near Post Office Road. It is anticipated that all the access roads will become public streets.

The most northerly access point will be located at a relocated Dog Lane. As a result of the Storrs Center development, approximately 200 feet of the existing Dog Lane



BACKGROUND PEAK HOUR TRAFFIC VOLUMES STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 4

approach will be realigned to the north and connected with the internal site access road (Road "A"). Instead of continuing as the north leg of a signalized offset intersection with Storrs Road (State Route 195) at Bolton Road, Dog Lane will be relocated approximately 110 feet north of its existing location as an unsignalized intersection. The Dog Lane approach to Storrs Road (State Route 195) will be restricted to right-turn movements only. The second access point (Road "A") will be located directly opposite Bolton Road, forming the fourth leg of the signalized intersection. The Road "A" approach configuration will consist of an exclusive left turn lane and a shared through/right turn lane. The third access point (Road "B"), unsignalized, will be located approximately 350 feet north of Post Office Road. The unsignalized Road "B" will provide one lane in and one lane out. In addition, there will be a secondary one-way in access (Road "C") located about 120 feet south of Road "B". The fourth access point (Road "D"), also unsignalized, will be located on Post Office Road, approximately 280 feet east of Storrs Road (State Route 195). Road "D" will provide one lane in and one lane out.

Efforts have been made to reduce the number of existing curb cuts and traffic conflicts along State Route 195 (Storrs Road). As a result, the existing Mansfield Town Hall Driveway has been closed and consolidated with the E.O. Smith High School driveway, about 80 feet to the north.

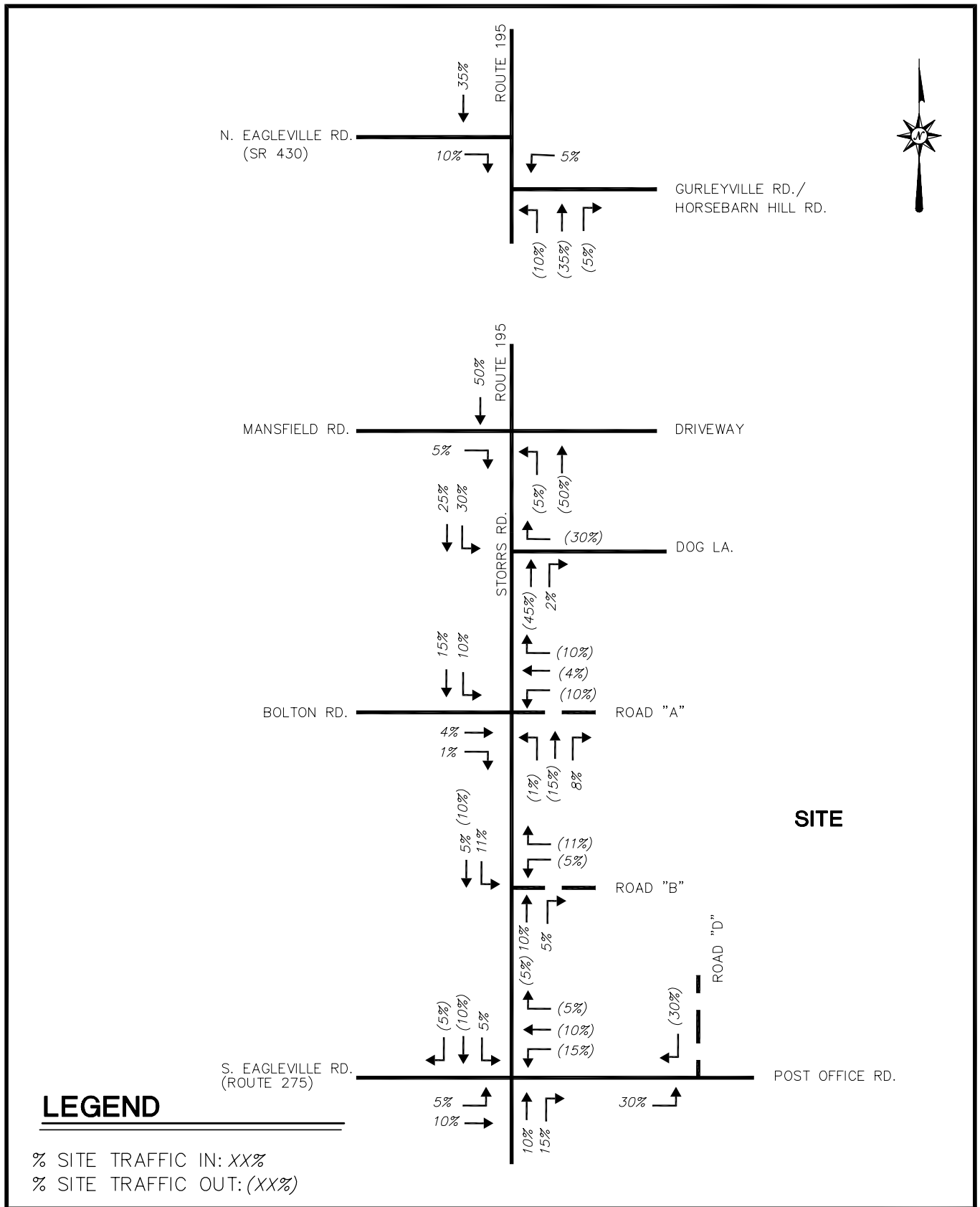
Planned Improvements by Others

There are two recommendations in the recently completed Storrs Campus Master Plan Update (see Appendix) that should be beneficial to traffic operations along the State Route 195 corridor, as well as reducing cut through traffic in residential neighborhoods near campus. The extension of North Hillside Road from its current terminus on campus to Route 44 has been planned for several years. Environmental impact documents are currently being prepared and the roadway is anticipated to be constructed in 2010 or 2011. This extension will provide some traffic relief along the Storrs Road (State Route 195) corridor, although such benefit is not quantified and has not been incorporated into this study. The second project is the extension of Bolton Road to South Eagleville Road (State Route 275).

As noted previously, the University must widen Mansfield Road approaching Storrs Road as a condition of STC Certificate # 904E.

Trip Distribution

Trip distribution is the projected percentage of the site traffic oriented along specific directions and routes to arrive at and depart the site. The trip distribution of the development's traffic along the existing roadway network was based on current travel patterns and the proposed site access. Figure 5 shows the expected trip distribution.



TRIP DISTRIBUTION STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 5

Site Traffic Volumes

Trip generation defines the number of trips oriented to and from a particular land use. Typically, trip generation rates quantify a per unit relationship between the size of a specific land use and the number of vehicle trips generated per unit of time. When analyzing the common suburban development proposal, this task is relatively straightforward. The rates for the type of development are taken from the Institute of Transportation Engineers (ITE), Trip Generation, 7th edition. That data base is the most comprehensive source of information on suburban development types, where trips are synonymous with cars. However, the Storrs Center project is not a typical suburban development. The location at the University of Connecticut and its design form is closer to what is commonly referred to as a new urbanist neighborhood development, having a compact mix of land uses, of higher density, in a pedestrian and transit friendly environment.

The typical suburban development tends to encourage travel by automobile with separation of land uses, lack of interconnectivity and support of trips by other modes. Carefully planned mixed-use development has the potential to reduce the traffic impact on the transportation system by encouraging and supporting trips by alternative modes, such as walking, biking and transit, and having a high rate of internal trip capture and trip chaining due to the mix of land uses.

The situation in Storrs provides a unique opportunity, at least for Connecticut. The University environment, with an enrollment of some 20,000 students, and on campus

residential capacity of 11,000, and more than 4,000 faculty and staff, contains all the ingredients to lessen dependence and usage of the automobile. Furthermore, unlike the typical suburban development, parking at Storrs Center will be either fee based or metered, an incentive to use a mode of travel other than the automobile.

Trip generation estimates for Storrs Center were based on rates for the individual components derived by others in preparing the Draft Environmental Impact Evaluation for the proposed graduate student apartments and downtown Mansfield Master Plan projects (Baystate Environmental Consultants, October 2002). A travel demand forecasting model (TMODEL) was previously developed for the University and calibrated for the campus area. The specific trip rates and overall traffic volumes can be found in the Appendix of this report.

As planned, the site will include 690 residential units (mostly efficiencies and one bedroom), 164,086 square feet of retail space (including building DL-1) and 46,743 square feet of office space. The existing site, however is not vacant. Some existing buildings along Storrs Road and Dog Lane will be demolished to permit the development of Storrs Center. These buildings account for about 53,000 square feet of retail/commercial space and 12,000 square feet of office space. Therefore in terms of net trip generation, Storrs Center is actually somewhat smaller in scale that the gross size might suggest.

Not all trips generated by a development, particularly one of this type, are new to the roadway network. The traffic volumes cited above reflect the total site traffic, which is composed of new trips, “pass-by” and “diverted” trips. Many motorists who patronize a store can be considered "pass-by" site traffic, which includes:

- Drivers already on the road traveling past the site to a final destination other than the proposed use, who decide on impulse to patronize the subject use.
- Drivers already on the road traveling past the site to a final destination other than the proposed use, who planned to patronize the subject use because it is "on the way".

For the retail use, CDOT allows the maximum pass-by credit to be the lesser of 20 percent of the site-generated traffic, or 10 percent of the adjacent street traffic, resulting in a very conservative analysis. For this study, 20 percent of the retail generated traffic is less than 10 percent of the traffic passing the site for both the weekday morning and afternoon peak hours. Thus the “20 percent” pass-by was utilized and subtracted from the retail portion of site generated traffic for the weekday morning and afternoon peak hour analyses.

When multiple land uses are located on one or adjacent interconnected sites, a portion of the generated trips will be captured between different uses. For example, some of the trips made by office workers to shops and restaurants may occur on site. An analysis was performed based on the procedure described in the Trip Generation Handbook, 2nd edition. The results suggest that 13 percent of trips could be considered internally captured trips. A conservative internal capture rate of ten percent (10%) was utilized for this study.

Lastly, given the unique environs of the Storrs Center, which provides bus transit access as well as good pedestrian and bicycle connections, a 10% trip reduction due to transit, walking and bicycling was utilized. The procedure for estimating this type of vehicle trip reduction can be found in Appendix B of the Trip Generation Handbook, also published by ITE.

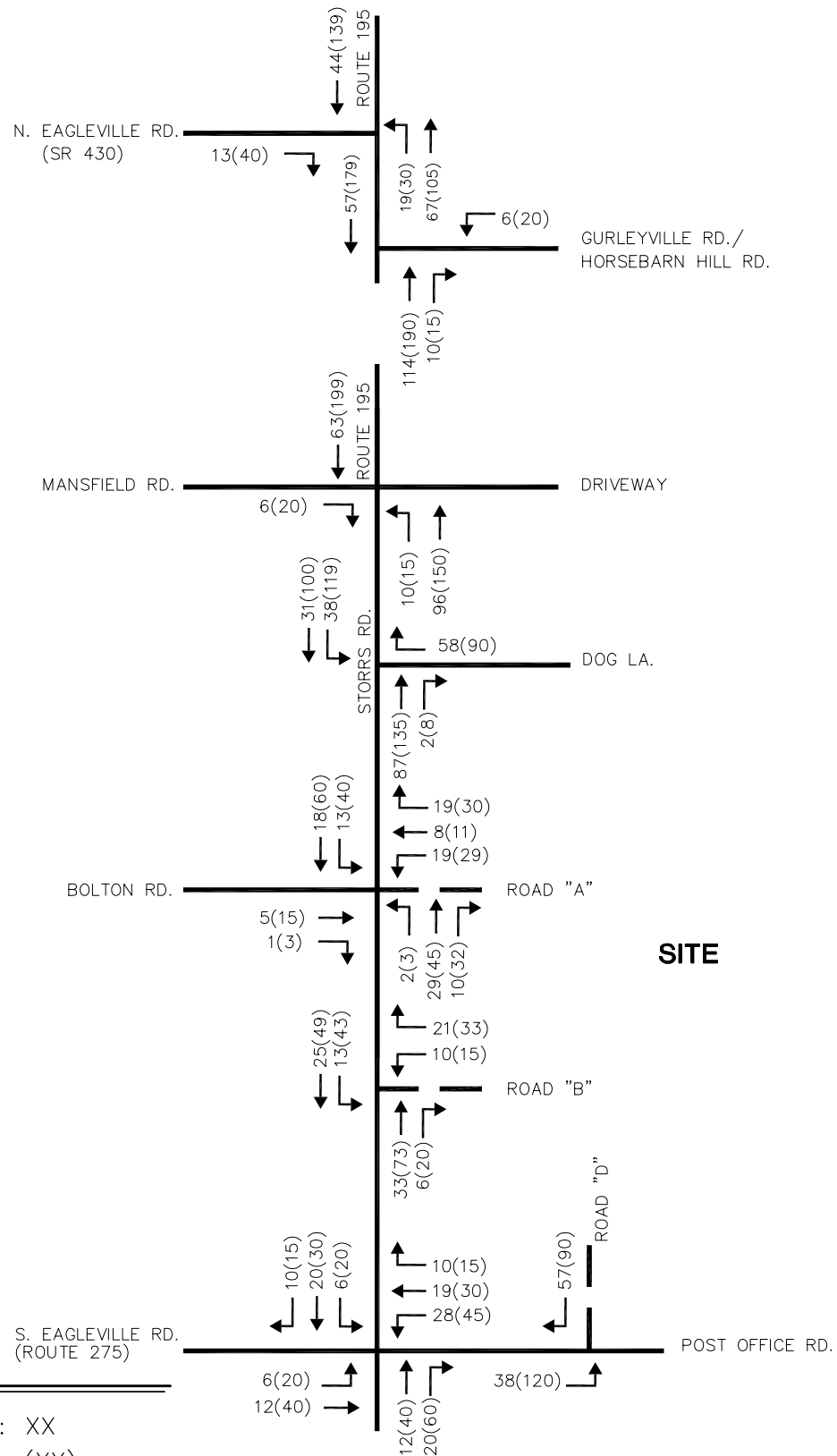
Table 1 summarizes the trip generation for the weekday morning and afternoon peak hours.

Table 1
Anticipated Peak Hour Trip Generation

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Residential	32	182	214	275	118	393
Retail/Commercial	93	62	155	266	266	533
Office	56	47	8	8	44	52
Total Site	173	252	425	550	429	978
- 20% Retail Pass-by	-16	-16	-32	-53	-53	-106
- 10% Internal	-17	-25	-42	-55	-43	-98
Subtotal	139	211	350	442	333	774
- 10% Transit, Walk, etc	-14	-21	-35	-44	-33	-77
Net Site Traffic	125	190	315	397	299	697

The site traffic volumes were assigned onto the adjacent roadway network, given the trip distribution shown in Figure 5. The site peak hour generated traffic is depicted in Figure 6. The pass-by traffic volumes, which are distributed at the site driveways, are shown in Figure 7.

	AM	PM
IN	125	397
OUT	190	299
	315	696



LEGEND

AM PEAK HOUR: XX
PM PEAK HOUR: (XX)

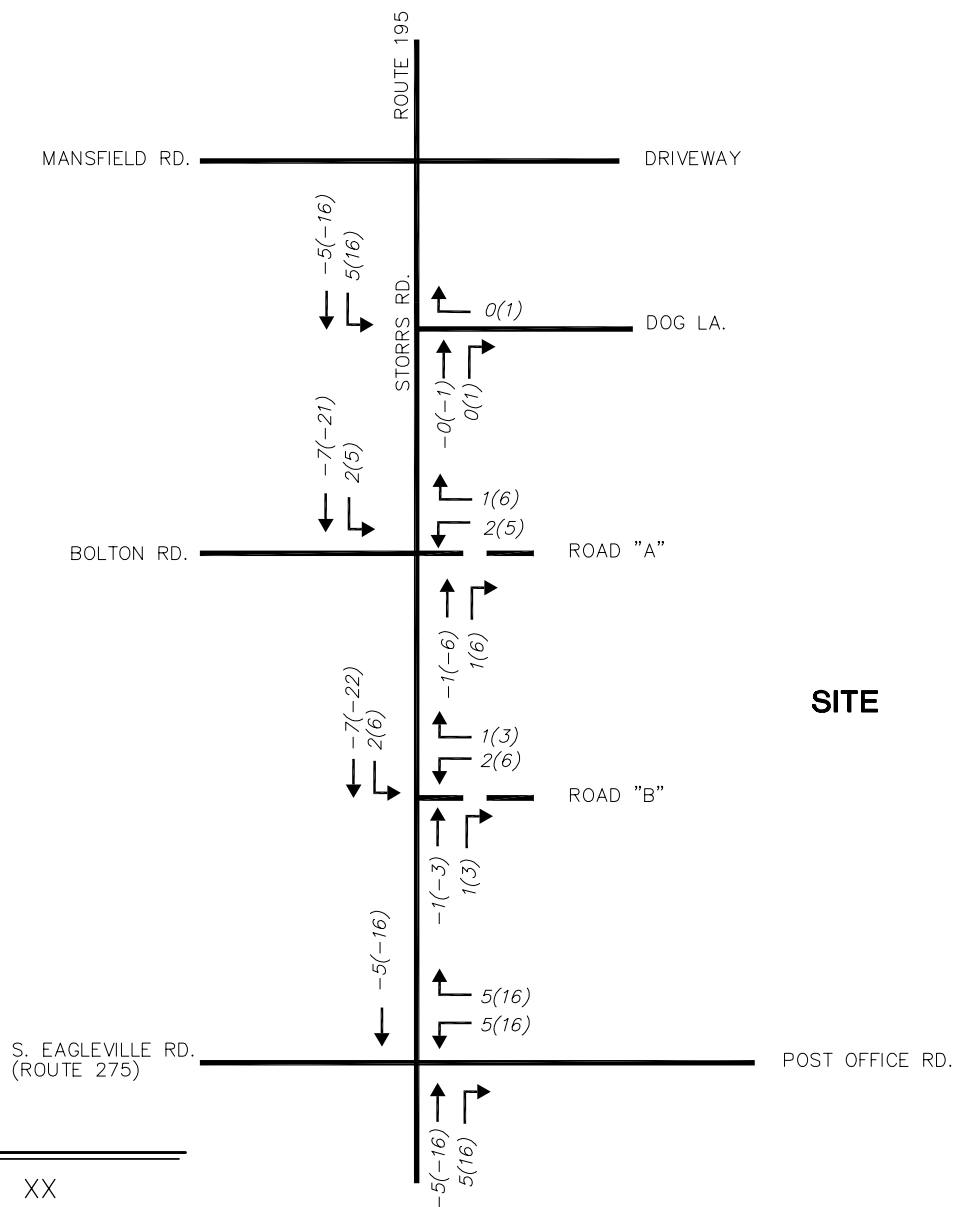


SITE PEAK HOUR TRAFFIC VOLUMES STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 6

	AM	PM
IN	16	53
OUT	16	53
	32	106



LEGEND

AM PEAK HOUR: XX
PM PEAK HOUR: (XX)



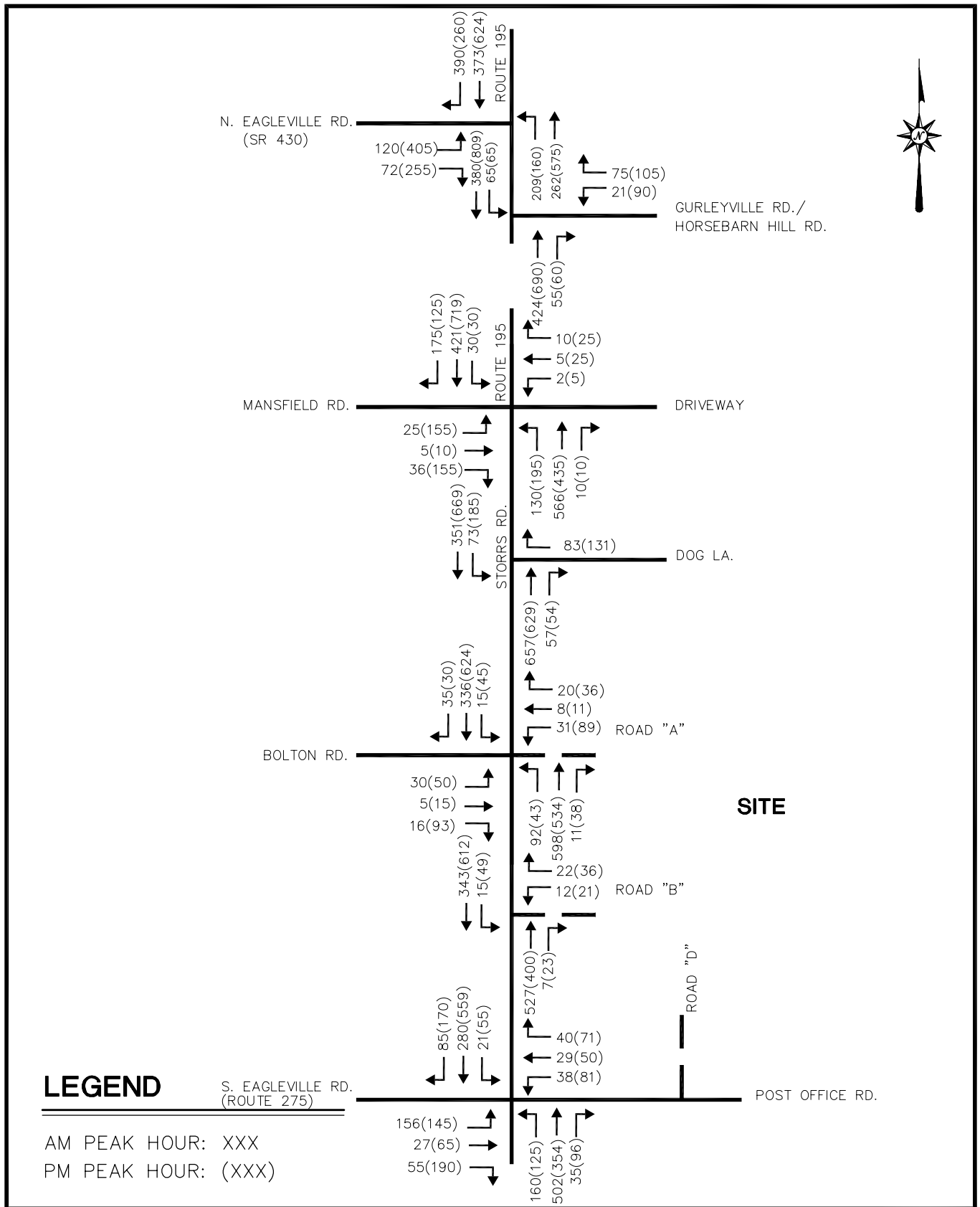
PASS-BY TRAFFIC VOLUMES STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 7

Full Build Traffic Volumes

The anticipated traffic volumes generated by Storrs Center were superimposed onto the background traffic volumes to establish the full build traffic volumes as depicted in Figure 8.



FULL BUILD TRAFFIC VOLUMES STORRS CENTER MANSFIELD, CONNECTICUT

SCHEMATIC, NOT TO SCALE

FIGURE 8

IV. ROADWAY ADEQUACY

Roadway adequacy determinations were performed for the existing, background, and full build traffic conditions to simulate the traffic impact of the proposed development on the adjacent roadway network. These roadway adequacy determinations were based on the methodology described in the Highway Capacity Manual (HCM), published by the Transportation Research Board.

Signalized Intersections

Signalized intersections are analyzed in terms of vehicle capacity and total delay. Capacity is the maximum rate of vehicle flow through an intersection given typical operating conditions. The number of vehicles traveling through an intersection is divided by the capacity of the intersection to determine an overall volume to capacity ratio (v/c). A v/c value under 1.00 indicates that the number of vehicles traveling through an intersection is less than capacity.

As stated in the HCM, level of service for signalized intersections is defined in terms of control delay. Control delay measures the increase in delay a motorist experiences while encountering a traffic control signal. These factors include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. This delay is computed per vehicle for a 15-minute analysis period and is associated with the levels of service, which are summarized in Table 2 below.

Table 2
Signalized Intersection – Levels of Service

Level of Service	Control Delay (seconds/vehicle)
A	< 10.0
B	10.1-20.0
C	20.1-35.0
D	35.1-55.0
E	55.1-80.0
F	> 80.0

Level of service A represents the optimum level where most motorists arrive at the subject intersection during the green phase and thus experience virtually no delay. Conversely, level of service F indicates that motorists are delayed over a minute while traveling through the intersection, and implies a complete breakdown of some movement(s) at that location. Level of service D is usually considered the limit of acceptable motorist delay. The following signalized intersections were analyzed as part of this study.

- Storrs Road (State Route 195) at State Route 275 (South Eagleville Road) and Post Office Road
- Storrs Road (State Route 195) at Bolton Road / Road "A" *
- Storrs Road (State Route 195) at Dog Lane
- Storrs Road (State Route 195) at Mansfield Road
- Storrs Road (State Route 195) at Gurleyville Road (Horsebarn Hill Road)
- Storrs Road (State Route 195) at North Eagleville Road (State Route 430)

* Under the build condition, Road "A" will form the fourth leg of the intersection

Unsignalized Intersections

Unsignalized intersections are generally evaluated in terms of average side street delay, as well as the capacity of the roadway approach. This analysis is based on the random arrival of vehicles and the associated gaps generated by this random arrival within the

traffic stream. There is no overall level of service for unsignalized intersections, other than for all way stops. The relationship between levels of service and average side street delay are summarized in Table 3 below.

Table 3
Unsignalized Intersection - Levels of Service

Level of Service	Control Delay (seconds/vehicle)
A	< 10.0
B	10.1-15.0
C	15.1-25.0
D	25.1-35.0
E	35.1-50.0
F	> 50.0

Two unsignalized intersections were analyzed for this study. One is the realigned Dog Lane intersection, and the other is the proposed Road “B” at Storrs Road (State Route 195), about 350 feet north of South Eagleville Road (State Route 275).

Intersection Analyses

The lane arrangement and type of traffic control were first assumed to remain unchanged. Table 4 shows the results of the analyses. Computations are provided in the Appendix to this report.

Table 4
Peak Hour Overall Intersection Level of Service Summary

Intersection	Existing	Background	Build
State Route 195 at S. Eagleville/Post Office	B(B)	C(B)	C(D)
State Route 195 at Bolton Road	B(B)	B(B)	-
State Route 195 at Bolton Road/Road "A"	-	-	B(B) ³
State Route 195 at Dog Lane	B(B)	B(C)	C(C) ¹
State Route 195 at Mansfield Road	A(C)	B(C)	B(E)
State Route 195 at Gurleyville Road	B(B)	B(C)	B(C)
State Route 195 at N. Eagleville Road	B(C)	B(C)	B(D)
State Route 195 at Road "B"	-	-	C(C) ²

Morning Peak Hour = X, Afternoon Peak Hour = (X)

¹ - Unsignalized, Right turn from Dog Lane (proposed configuration)

² - Unsignalized, Road "B" approach

³ - Proposed configuration

As shown in Table 4, except for the intersections of Storrs Road (State Route 195) at Mansfield Road, the overall intersection LOS will remain at "D" or better under the build scenario. While overall intersection LOS is important, it is only a weighted average of all the traffic movements, and a review of individual movements gives a better indication of operations. A detailed review of individual traffic movements in the analyses revealed the following issues, which should be addressed in the mitigation proposal:

- Storrs Road (State Route 195) at Mansfield Road - the southbound through movement during the weekday afternoon peak hour is projected to deteriorate to LOS "F", from "C" under build conditions, with the volume exceeding capacity.
- Storrs Road (State Route 195) at Post Office Road - the level of service for the Post Office Road approach during the afternoon peak hour is projected to

deteriorate to LOS “F”, from “C” under build conditions, with the volume near capacity.

- Storrs Road (State Route 195) at Gurleyville Road - the level of service for the left turn movement from Gurleyville Road operates at LOS “E” under existing, background and build afternoon peak hour volumes. Volumes will however, not exceed capacity. A minor increase in this traffic movement is attributable to Storrs Center.
- Storrs Road (State Route 195) at North Eagleville Road (State Route 430) - the level of service for the left turn movement from North Eagleville Road operates at LOS “E” under existing, background and build afternoon peak hour volumes. Volumes will however, not exceed capacity. Storrs Center will not add traffic to this movement.
- Storrs Road (State Route 195) at North Eagleville Road (State Route 430) - the level of service for the Storrs Road southbound through movement is projected to deteriorate from LOS “D” under the background afternoon peak hour volumes to LOS “F” under build conditions. Volumes will exceed capacity. Storrs Center will add traffic to this movement.

V. CONCLUSIONS AND RECOMMENDATIONS

Some transportation improvements will be necessary to accommodate Storrs Center traffic while maintaining acceptable levels of service. These should be planned recognizing the special setting and the desire to maintain/enhance a walkable local and university community. Trends in recognizing the need to provide more modal balance in transportation facility design, as reflected in recent publications such as “Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities” by the Institute of Transportation Engineers (ITE), should be considered when finalizing the detailed design. One of the goals of the “Office of Responsible Growth” recently established by the Governor is to “increase opportunities to promote mass transit and roadway design that supports state and local economic development while preserving and enhancing the character, as well as the walkability, of Connecticut’s communities”.

Recommended improvements to maintain acceptable traffic operations, some of which have already been incorporated into the plan, include the following:

1. Storrs Road (State Route 195) at Bolton Road and Dog Lane

The offset intersection will be reconfigured to a more conventional four way type, as shown on the plans, thereby simplifying the traffic signal operation. Replacement/modification of the traffic control signal will also be required.

2. Storrs Road (State Route 195) at Mansfield Road

Construct a southbound Storrs Road (State Route 195) right turn lane. This would result in the overall intersection level of service during the afternoon peak being “C”, rather than “E”, if no mitigation were performed. The non-critical morning peak hour levels of service would be “A” with the improvements, rather than “B” without. The most problematic traffic movement, the southbound through movement, would operate at a level of service of “D” rather than “F”. It would also be desirable to provide a proper two lane approach from Mansfield Road at the traffic signal. It should be noted that as part of STC Certificate #904E, issued in 2000, UCONN must widen Mansfield Road to provide a proper two lane approach to State Route 195. The two improvements should be coordinated.

3. Storrs Road (State Route 195) at South Eagleville Road (State Route 275) and Post Office Road

Post Office Road will be widened to provide for a two lane approach to the traffic signal, as shown on the plans. This would result in a “D” level of service for the approach during the afternoon peak rather than “F”. The overall intersection LOS would improve to “C” rather than “D” if no improvements were implemented.

4. Storrs Road (State Route 195) at North Eagleville Road (State Route 430) and Gurleyville Road

A retiming of the traffic signal can provide some degree of mitigation for the projected afternoon operational problems at this location. The Gurleyville Road intersection would operate essentially as under background conditions. The volume to capacity ratio for

all traffic movements at the North Eagleville Road intersection would be less than 1.0, but an “E” level of service will remain for the North Eagleville Road left turn movement (same as in background), and the Storrs Road (State Route 195) southbound through movements. As noted, some deficiencies with the existing State owned traffic controller might have to be addressed first. It does not appear that traffic operations can be improved over background conditions without some physical improvements. Prior studies for UCONN have suggested that in the longer range, the intersection will require physical improvement, such as designating the North Eagleville Road approach for a left turn lane and a left/right lane, combined with widening of portions of Storrs Road (State Route 195) to accept the double left turn.

As noted earlier, the extension of North Hillside Road to Route 44 should siphon off some traffic in this area, particularly through this intersection.

5. Storrs Road (State Route 195) - Mid-block pedestrian crossings

There are two existing mid-block pedestrian crossings located between South Eagleville Road (State Route 275) and Bolton Road. The northerly, at E.O. Smith High School and Storrs Commons will remain at essentially the same location. The most southerly will be relocated approximately 125 feet to the south, closer to Town Hall. Since traffic on Storrs Road (State Route 195) will be increased, consideration should be given to installation of pedestrian crossing enhancements, such as in pavement warning lights or pedestrian activated beacons.

6. Transit

As noted in this study, the area has considerable transit service, provided primarily by the University. Given the existing limited land uses at this end of Storrs Road (State Route 195), only the Yellow Line and the Windham Regional Transit District route actually reach the site. Storrs Center will work closely with the University to enhance service to the site. This might include extension or modification of existing routes, and expanded weekend and evening service. In addition, appropriate bus shelters and stops should be provided.

7. Local cut through traffic

Questions have been asked about the potential for through traffic to use local streets, such as Gurleyville Road, Willowbrook Road, Hanks Hill Road or Separatist Road as a cut through to reach, or bypass, the Storrs Center area. While it is impossible to quantify such movements, and the alternative routes are generally longer (time and distance), the possibility exists. Diversion to alternate routes is a function of perceived convenience. For example, during the weekday afternoon period, the trip along Storrs Road (Route 195) from Gurleyville Road to Hanks Hill Road (a distance of about 4,900 feet) takes about 3'15". An alternate routing between the same two points, via Gurleyville Road, Bundy Lane, Farrell Road and Hanks Hill Road, a distance of nearly 10,500 feet takes about 5 minutes. While there is no measurable benefit to using the alternate route, some motorists may make that choice. Should an undesirable situation develop, the implementation of traffic calming techniques, such as speed humps as exist along Dog Lane, Eastwood and Westwood Road, traffic circles or entrance

treatments may be appropriate. The Town will monitor the situation and install traffic calming treatments as needed.

Based on this investigation and analysis, the potential traffic impact of Storrs Center on the nearby roadway network can be mitigated to a large degree with the recommended improvements. By implementing these improvements, traffic movements at all critical intersections will operate at a level of service (LOS) “D” or better.

The current and/or potential problems at the North Eagleville Road (State Route 430) intersection, and cut through issues along Separatist Road should be mitigated when North Hillside Road is extended to Route 44, sometime in 2008. The extension of Bolton Road to South Eagleville Road (State Route 275), as noted in the latest UConn Master Plan should lessen campus traffic impact on Eastwood and Westwood Roads.

Table 5 shows the overall intersection level of service under the “build” and “build with improvement” scenarios for those intersections where mitigation is proposed.

Table 5
Peak Hour Overall Intersection Level of Service Summary - Mitigation

Intersection	Build	Build w/Improvement
State Route 195 at S. Eagleville/Post Office	C(D)	C(C)
State Route 195 at Mansfield Road	B(E)	A(C)
State Route 195 at Gurleyville Road	B(C)	-(C)
State Route 195 at N. Eagleville Road	B(D)	-(C)

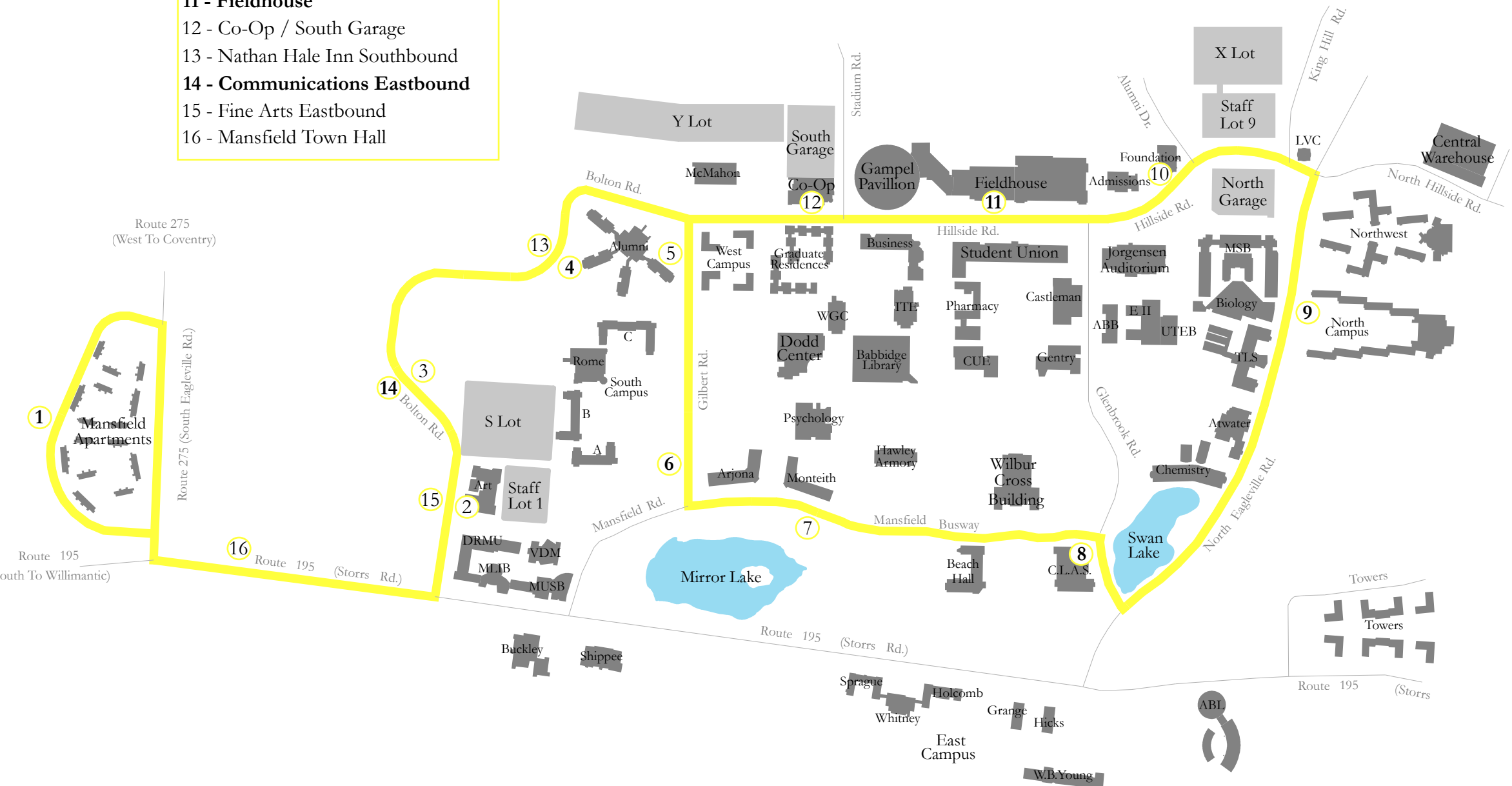
Morning Peak Hour = X, Afternoon Peak Hour = (X)

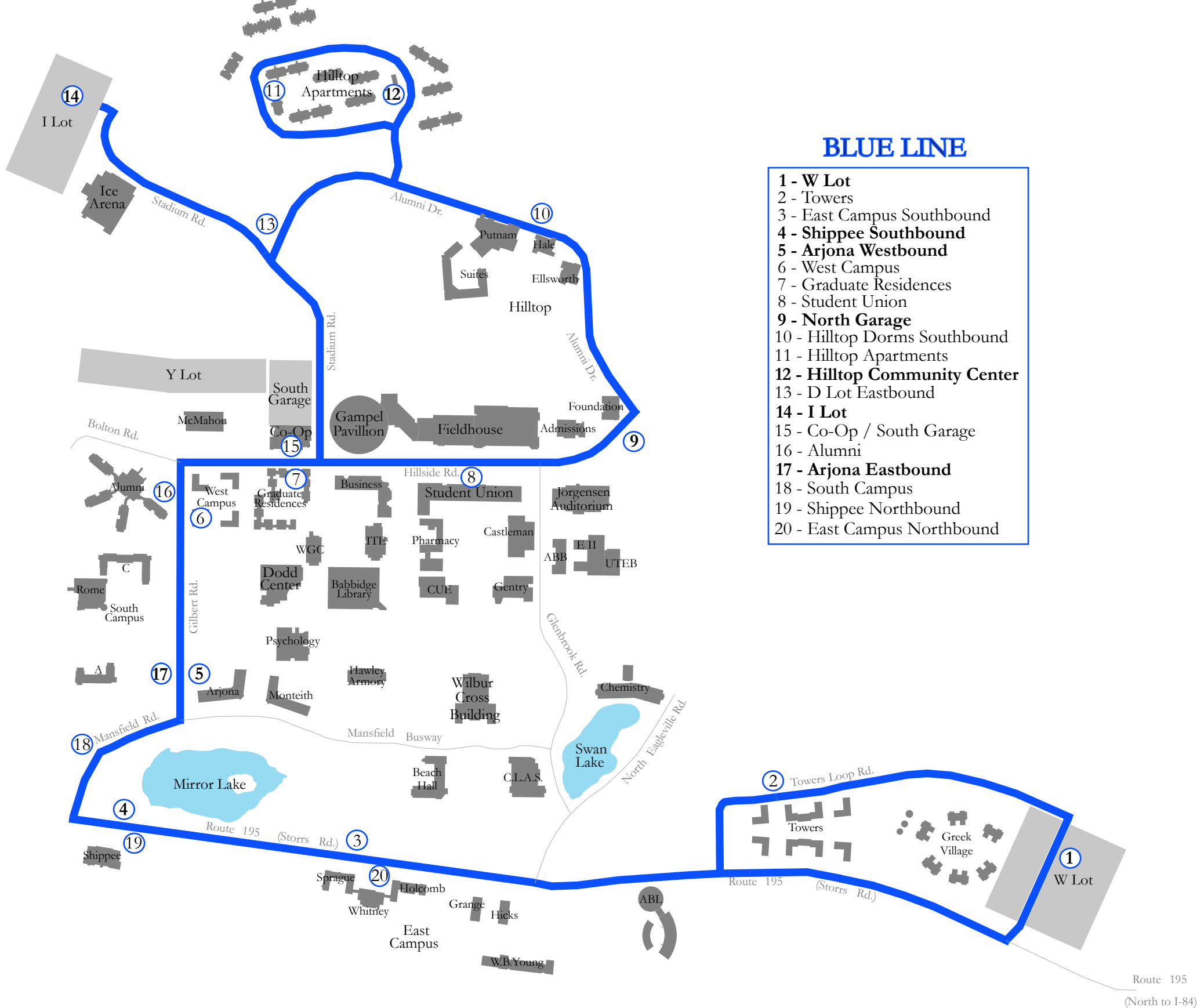
APPENDIX

BUS ROUTES

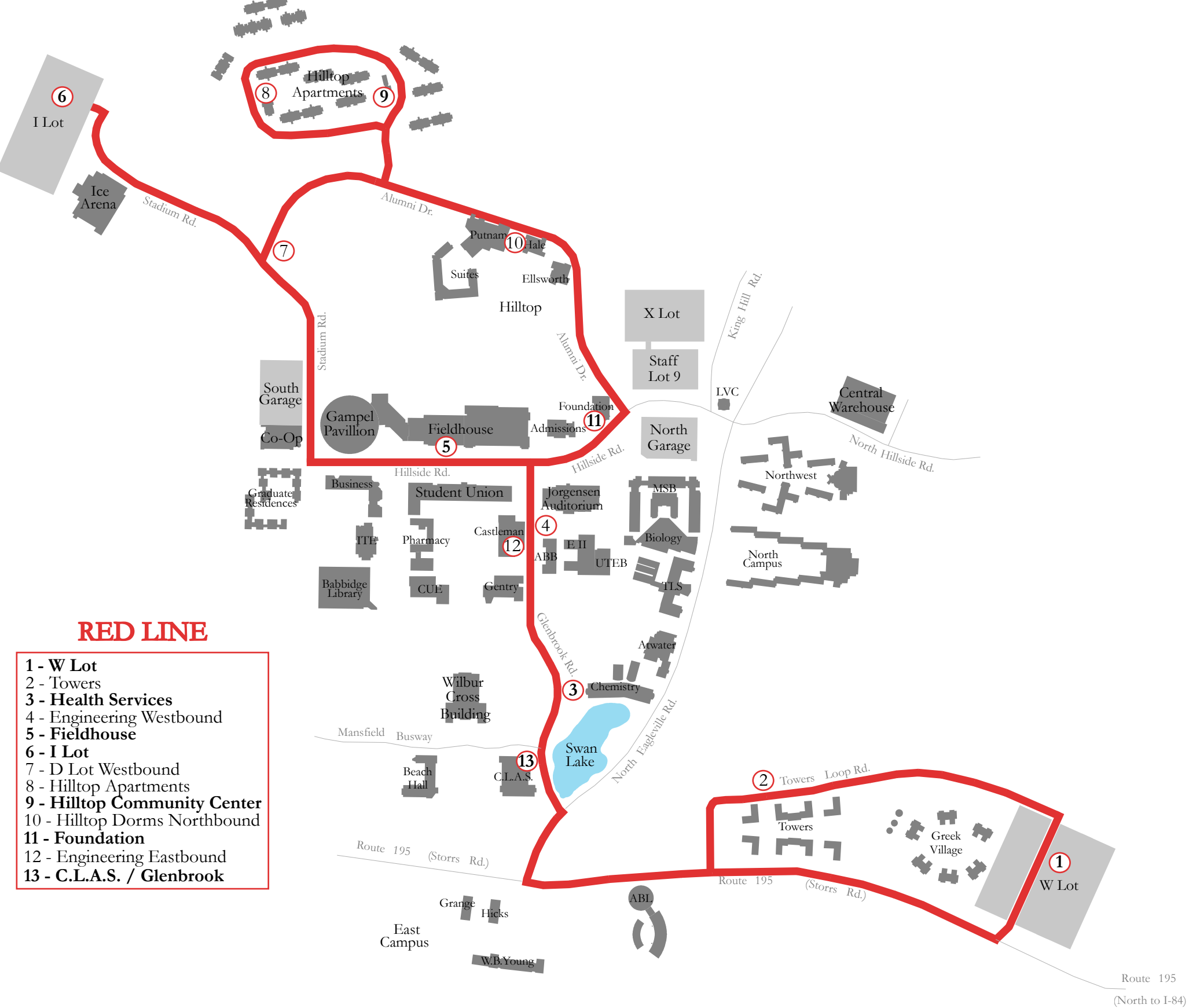
YELLOW LINE

- 1 - Mansfield Apartments**
- 2 - Fine Arts Westbound
- 3 - Communications Westbound
- 4 - Nathan Hale Inn Northbound**
- 5 - Alumni
- 6 - Arjona Eastbound**
- 7 - Monteith
- 8 - C.L.A.S.**
- 9 - North Campus**
- 10 - Foundtion
- 11 - Fieldhouse**
- 12 - Co-Op / South Garage
- 13 - Nathan Hale Inn Southbound
- 14 - Communications Eastbound**
- 15 - Fine Arts Eastbound
- 16 - Mansfield Town Hall



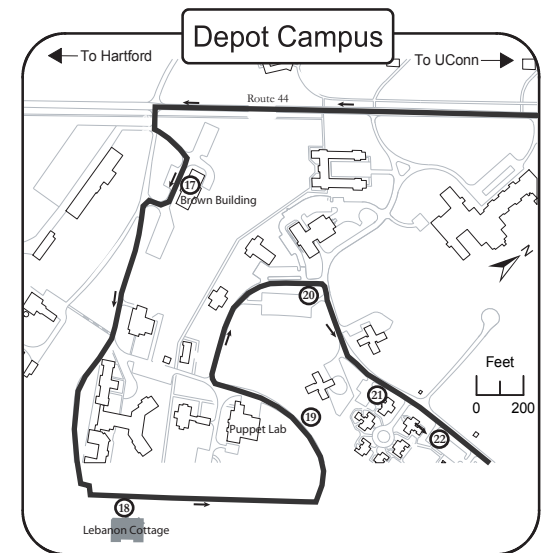
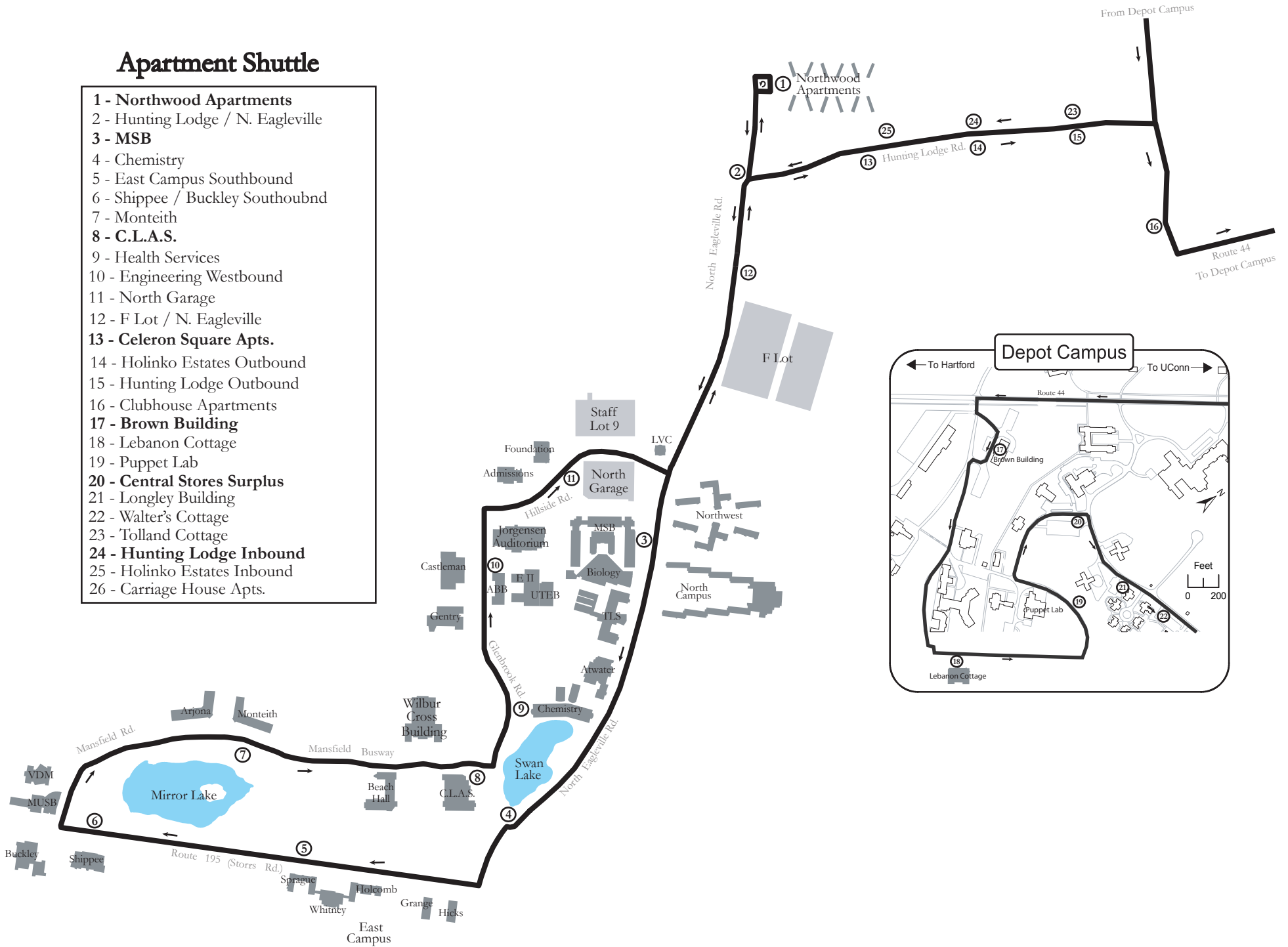






Apartment Shuttle

- 1 - Northwood Apartments
- 2 - Hunting Lodge / N. Eagleville
- 3 - MSB
- 4 - Chemistry
- 5 - East Campus Southbound
- 6 - Shippee / Buckley Southbound
- 7 - Monteith
- 8 - C.L.A.S.
- 9 - Health Services
- 10 - Engineering Westbound
- 11 - North Garage
- 12 - F Lot / N. Eagleville
- 13 - Celeron Square Apts.
- 14 - Holinko Estates Outbound
- 15 - Hunting Lodge Outbound
- 16 - Clubhouse Apartments
- 17 - Brown Building
- 18 - Lebanon Cottage
- 19 - Puppet Lab
- 20 - Central Stores Surplus
- 21 - Longley Building
- 22 - Walter's Cottage
- 23 - Tolland Cottage
- 24 - Hunting Lodge Inbound
- 25 - Holinko Estates Inbound
- 26 - Carriage House Apts.



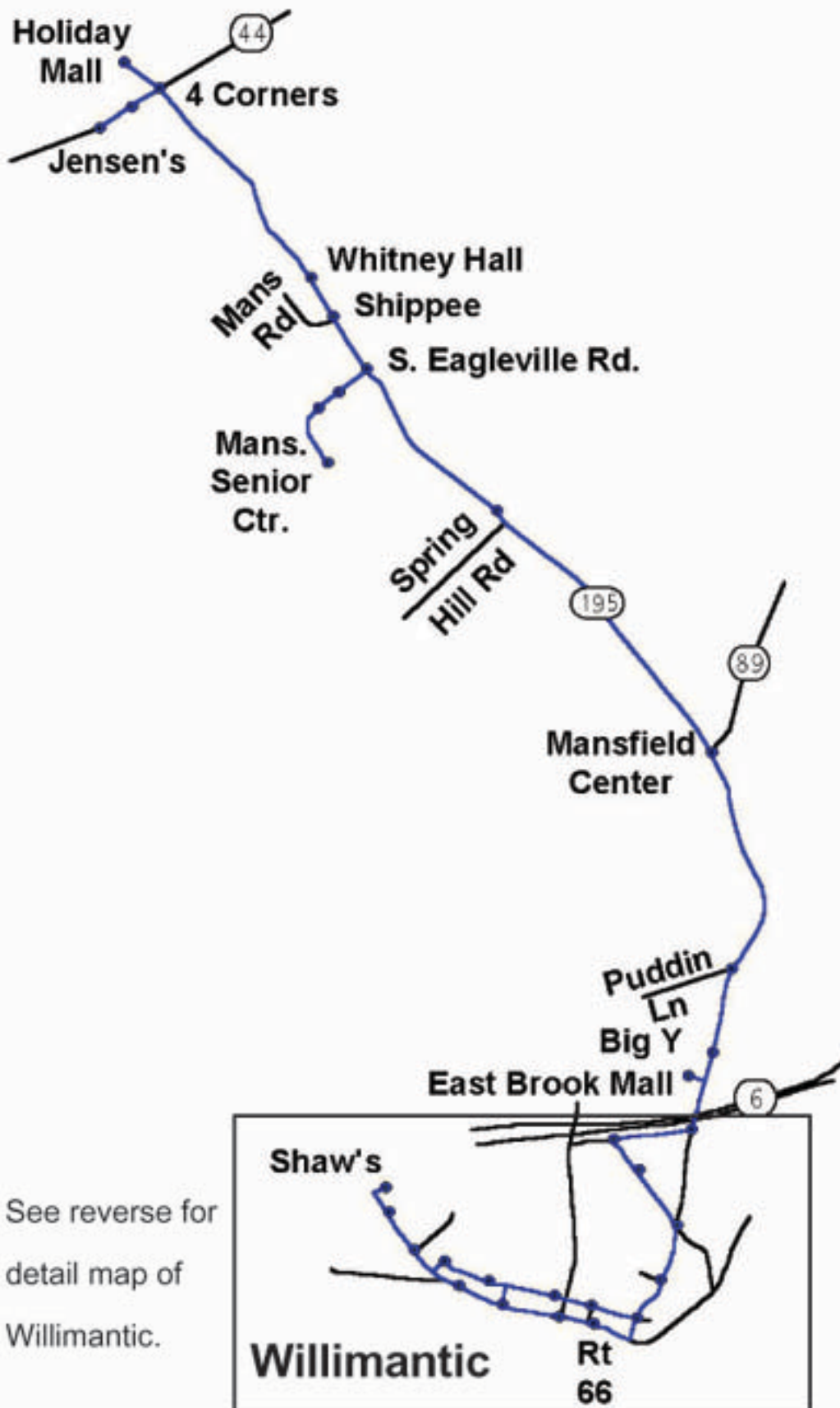
Weekend Shuttle

- 1 - W Lot
- 2 - Towers
- 3 - Chemistry Westbound
- 4 - North Campus
- 5 - Charter Oak Suites
- 6 - Charter Oak Apartments
- 7 - Central Warehouse / R Lot
- 8 - Upper F-Lot
- 9 - Lower F-Lot
- 10 - Northwood Apartments
- 11 - L Lot
- 12 - Hilltop Dorms Southbound
- 13 - Hilltop Apartments
- 14 - Hilltop Community Center
- 15 - Hilltop Dorms Northbound
- 16 - Foundation Building
- 17 - Field House
- 18 - South Garage / Co-Op
- 19 - Alumni Quadrangle
- 20 - Arjona Eastbound
- 21 - South Campus
- 22 - Shippee Northbound
- 23 - East Campus Northbound



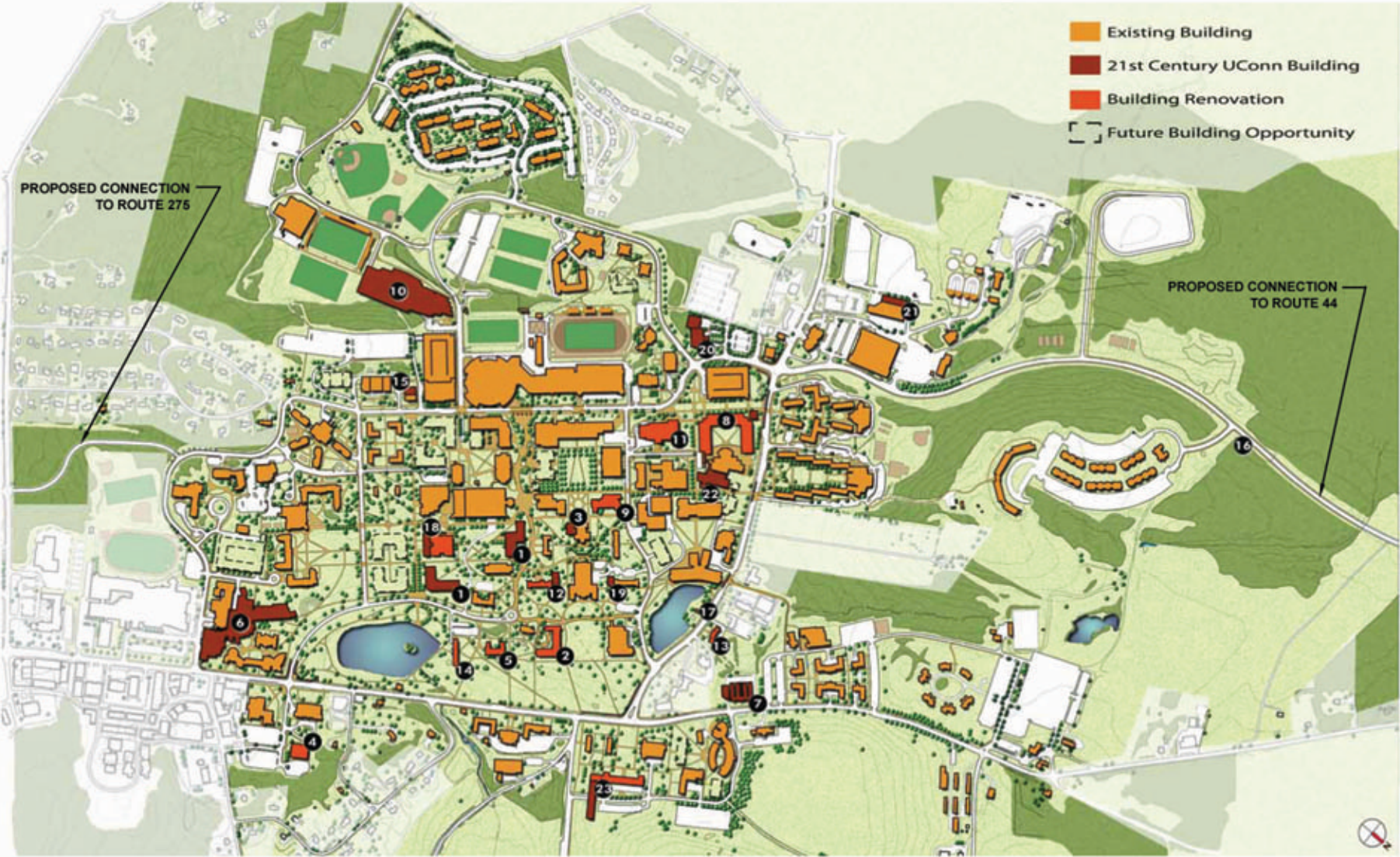
WRTD Storrs-Willimantic Route Map

This service is open to the public.



CAMPUS MASTER PLAN UPDATE

Planning Recommendations



Preliminary Master Plan